

(12) UK Patent Application (19) GB (11) 2 349 026 (13) A

(43) Date of A Publication 18.10.2000

(21) Application No 0001655.0

(22) Date of Filing 26.01.2000

(30) Priority Data

(31) 99003067

(32) 30.01.1999

(33) KR

(71) Applicant(s)

Samsung Electronics Co., Ltd.
(Incorporated in the Republic of Korea)
416 Maetan-dong, Paldal-gu, Suwon-city,
Kyungki-do, Republic of Korea

(72) Inventor(s)

Chang-Won Kwak

(74) Agent and/or Address for Service

Appleyard Lees
15 Clare Road, HALIFAX, West Yorkshire, HX1 2HY,
United Kingdom

(51) INT CL⁷

H04N 5/00 // H04N 5/44

(52) UK CL (Edition R)

H4F FBB FGG

(56) Documents Cited

GB 2339104 A GB 2330722 A EP 0849943 A1
WO 98/56188 A2 WO 97/28499 A1 JP 110150688 A
US 5838384 A

(58) Field of Search

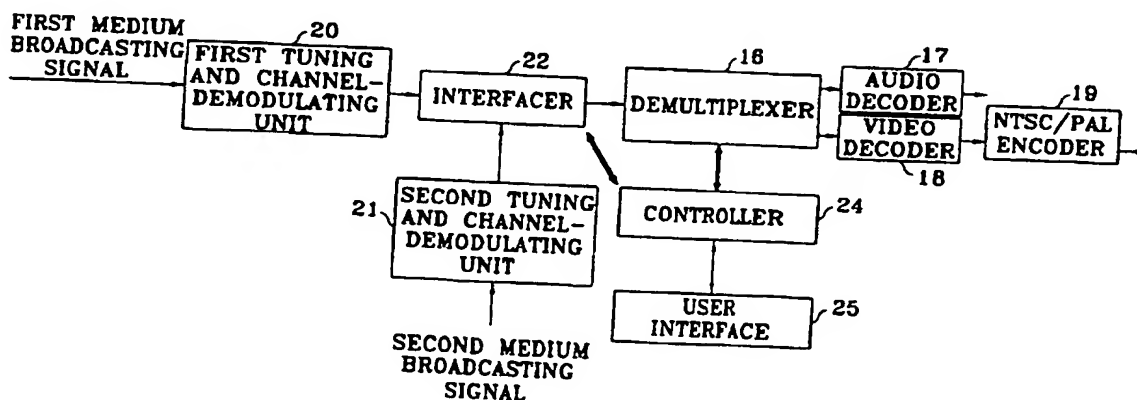
UK CL (Edition R) H4F FAAN FBA FBB FGG FKE FKX
INT CL⁷ H04N 5/00 5/44 7/167
ONLINE: WPI; JAPIO; EPODOC

(54) Abstract Title

Digital broadcast receiver for receiving two distinct digital signals

(57) A digital broadcast receiver for selectively watching one of at least two digital broadcasts transmitted via a respectively different medium is provided, which includes a tuning and channel demodulation unit 20 for receiving and channel-demodulating the at least two digital broadcast signals individually and restoring the received signals into a prior-to-being-channel-modulated bitstream, an interfacer 22 for selectively supplying one of the medium bitstreams output from the tuning and channel demodulation unit 20 according to an input select control signal, a controller 24 for searching the medium digital broadcasts which can be received in the tuning and channel demodulation unit 20 by controlling the interfacer 22 and supplying to the interfacer 22 the select control signal for selecting a bitstream corresponding to one of the medium digital broadcasts according to a user request among the searched digital broadcasts, and a demultiplexing and decoding unit 16-19 for demultiplexing the bitstream supplied from the interfacer 22, restoring the demultiplexed signal into prior-to-being-encoded broadcast signal of a programme.

FIG. 2



GB 2 349 026 A

FIG. 1 (PRIOR ART)

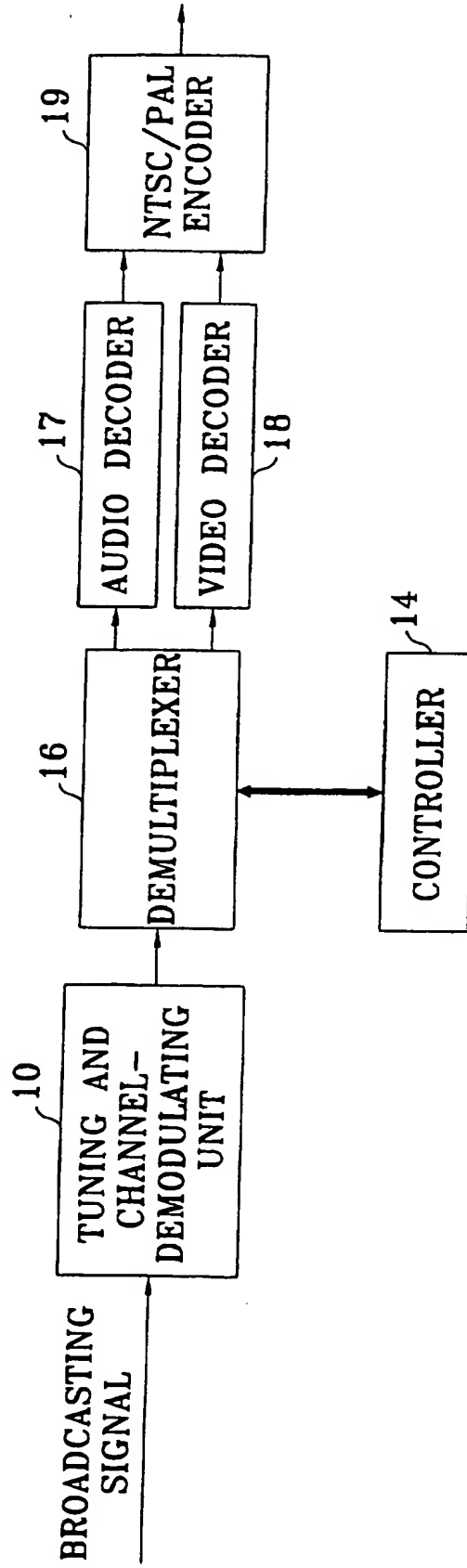


FIG. 2

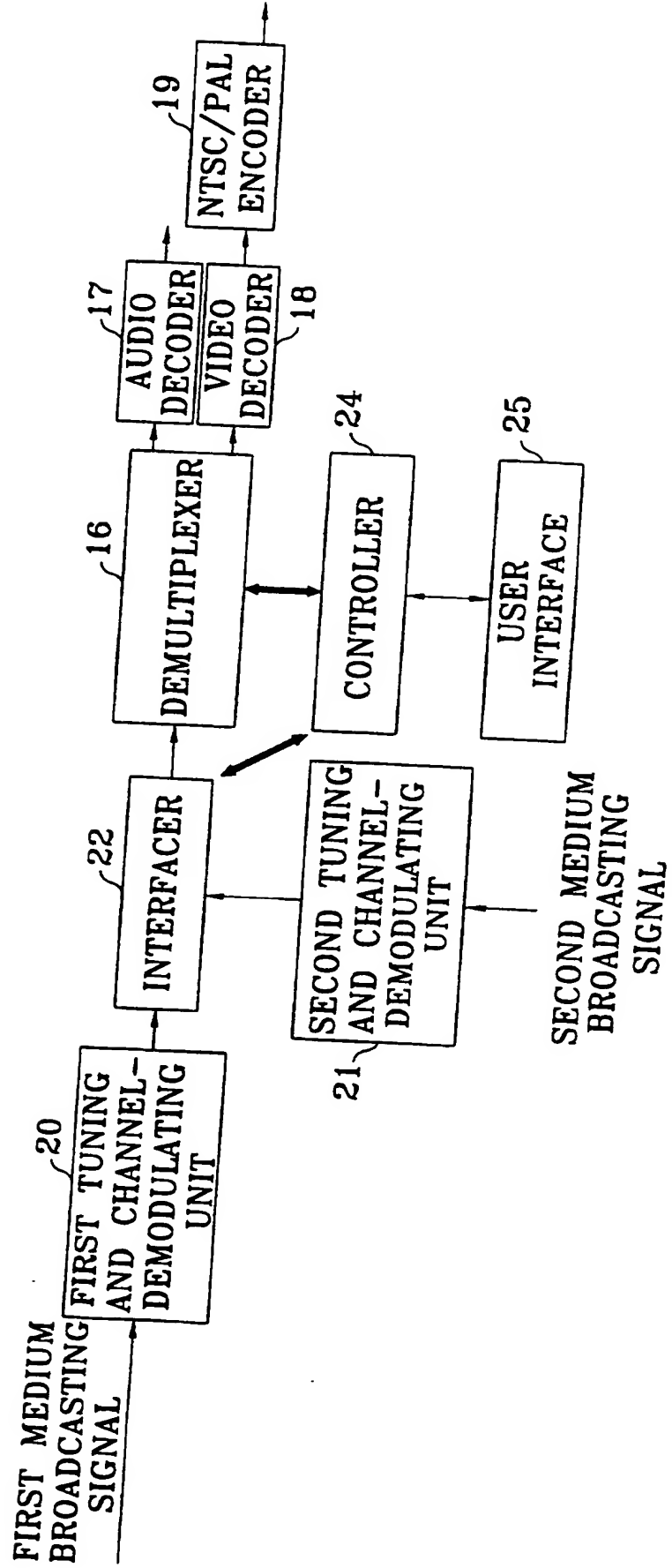


FIG. 3

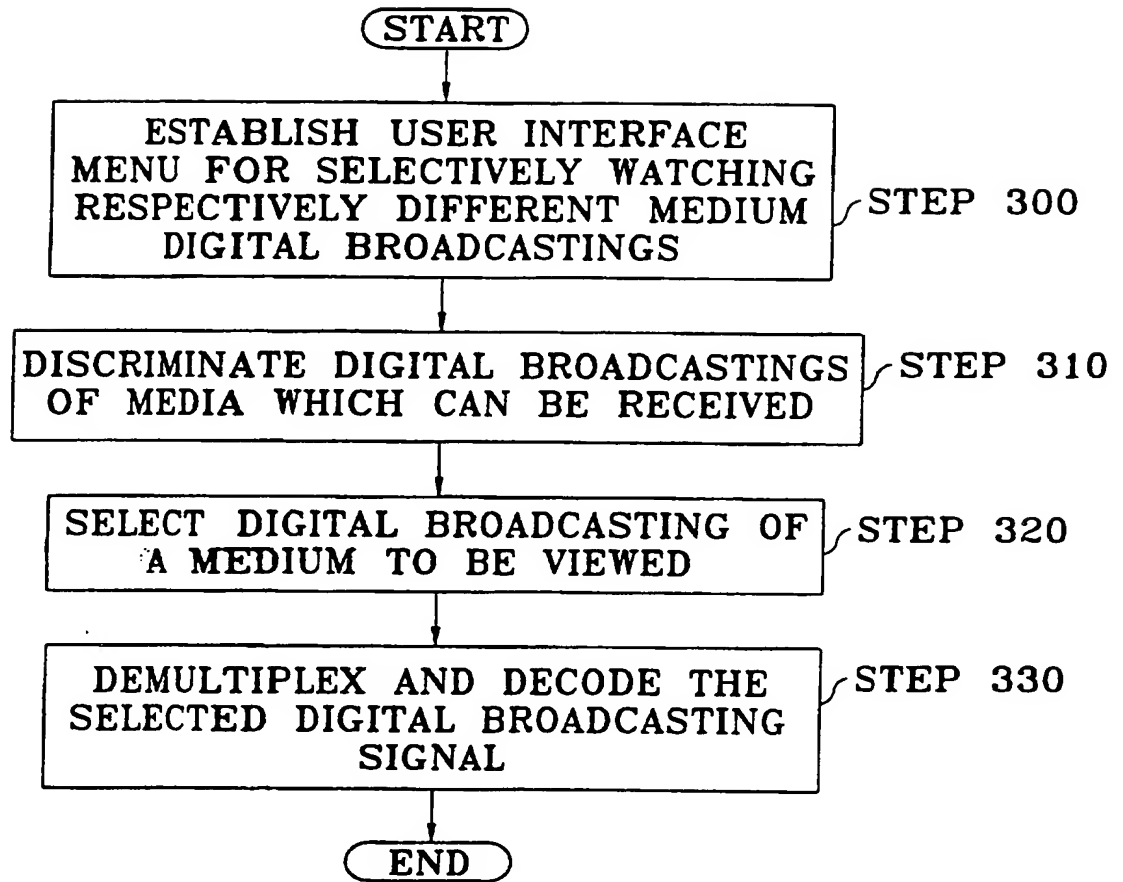
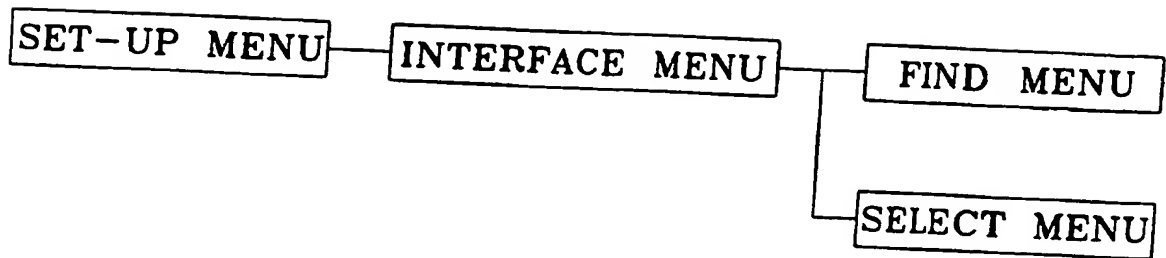


FIG. 4



METHOD AND APPARATUS FOR SELECTIVELY WATCHING
DIGITAL BROADCASTINGS OF RESPECTIVELY DIFFERENT
MEDIA

5 The present invention relates to a method for selectively
watching at least two digital broadcasts transmitted from
respectively different media and an apparatus therefor,
and more particularly, to a method for watching one of at
least two digital broadcasts which are transmitted from
10 respectively different media conveniently, efficiently and
economically and an apparatus therefor.

Digital broadcasts are classified into a digital
terrestrial broadcast, a digital satellite broadcast and a
15 digital cable broadcast according to a transmission
medium. At present, digital satellite broadcasts are
being activated worldwide and digital terrestrial
broadcasts are under test in the USA and some countries
such as the United Kingdom.

20 In digital broadcasts, the information content of each
programme channel is highly efficiently compressed based
on the MPEG coding standards, and the programmes
corresponding to a plurality of channels are highly
25 efficiently multiplexed and transmitted based on a digital
modulation method by each transmission medium. Thus,
digital broadcasting enables the broadcast of several tens
to hundreds of channels without using a plurality of
repeaters such as those which are used in analogue
30 broadcasting. In particular, digital TV broadcasting is
largely divided into a D-TV system (a Digital TV system)
having the ATSC-GA (Advanced Television systems Committee-
Grand Alliance) in the USA and a DVB system (Digital Video

Broadcasting System) in Europe. The D-TV system has been adopted as a digital broadcast standard in the USA and Korea and the DVB system has been adopted in most of the remaining countries which do not adopt the D-TV system. A
5 schematic configuration of a digital broadcast receiver including the digital broadcast standards will be described below with reference to Figure 1.

A tuning and channel demodulation unit 10 shown in figure
10 1 tunes and channel-demodulates a broadcast signal received via an antenna (not shown) in order to be restored into a prior-to-being-channel-modulated bitstream. Also, in the case that the restored bitstream has been error-correction-coded, the tuning and channel
15 demodulation unit 10 error-correction-decodes the bitstream to correct errors which occurred during transmission. A demultiplexer 16 parses the bitstream supplied from the tuning and channel demodulation unit 10 under the control of a controller 14, to thereby separate
20 the bitstream into a video stream and an audio stream of a particular programme among programmes multiplexed in the bitstream. The controller 14 controls the demultiplexer 16 so as to cause a particular programme among the programmes contained in the restored bitstream to be shown
25 in response to a user request. An audio decoder 17 restores the audio stream supplied from the demultiplexer 16 into prior-to-being-encoded audio data according to a corresponding decoding standard, and outputs the restored audio data to an audio processor (not shown). A video
30 decoder 18 restores the video stream supplied from the demultiplexer 16 into prior-to-being-encoded video data according to a corresponding decoding standard. An NTSC/PAL encoder 19 converts the video data supplied from

the video decoder 18 into an analogue broadcast signal according to an NTSC or PAL broadcast standard. A video processor (not shown) processes the analogue broadcast signal supplied from the NTSC/PAL encoder 19 into a signal
5 appropriate for displaying, and outputs the result to a display (not shown).

However, conventional digital broadcast receivers use channel modulation and demodulation methods which differ
10 from each other in different digital broadcast standards and which may be defined in accordance with the transmission media. Accordingly, a digital broadcast receiver manufactured to view digital broadcasts corresponding to a particular transmission medium cannot
15 view a digital broadcast of a different transmission medium.

-- .

In more detail, a digital broadcast receiver is largely sectioned into a unit for tuning and channel-demodulating
20 a broadcast signal which has been channel-modulated and transmitted, and a unit for demultiplexing and source-decoding the channel-demodulated signal. The digital broadcast receivers as explained above are distinguished from each other by the transmission media, for example, a
25 digital terrestrial broadcast receiver or digital satellite broadcast receiver can adopt the same standard in the demultiplexing and source-decoding unit, but should use a different channel demodulation method in the tuning and channel-demodulating unit based on the fact that the
30 channel modulation methods differ. Thus, the conventional digital terrestrial broadcast receiver cannot display a digital satellite broadcast and the conventional digital

satellite broadcast receiver cannot display a digital terrestrial broadcast.

With a view to solve or reduce the above problems, it is
5 an aim of the embodiments of the present invention to
provide an efficient method for receiving digital
broadcast signals corresponding to at least two
transmission media and selectively enable a user to watch
a selected one of said digital broadcast signals, in a
10 single digital broadcast receiver.

It is another aim of the present invention to provide a
digital broadcast receiver adopting the above method.

15 According to a first aspect of the present invention,
there is provided a method for selectively enabling the
display of one of at least two digital broadcasts
transmitted via respectively different media in a digital
broadcast receiver, the method comprising the steps of:
20 (a) establishing a user interface menu for selecting for
display one of the digital broadcasts; (b) discriminating
amongst the at least two digital broadcasts transmitted
via at least two media which can be received in the
digital broadcast receiver using the established user
25 interface menu; (c) selecting a digital broadcast of a
medium to be viewed among the discriminated medium digital
broadcasts; and (d) restoring the selected digital
broadcast signal into a prior-to-being-encoded broadcast
signal.

30

Here, it is preferable that the user interface menu
comprises a first menu for discriminating the digital
broadcasts of the media which can be received in the

digital broadcast receiver, and a second menu for selecting a particular digital broadcast among the discriminated digital broadcasts.

- 5 According to a second aspect of the present invention, there is also provided a digital broadcast receiver for selectively enabling the display of one of at least two digital broadcasts transmitted via a respectively different medium, the digital broadcast receiver
- 10 comprising: a tuning and channel demodulation unit for receiving and channel-demodulating the at least two digital broadcast signals individually and restoring the received signals into a prior-to-being-channel-modulated bitstream; an interfacer for selectively supplying one of
- 15 the medium bitstreams' output from the tuning and channel demodulation unit according to an input select control signal; a controller for searching amongst the digital broadcasts of the various media which can be received in the tuning and channel demodulation unit by controlling
- 20 the interfacer, and for supplying to the interfacer the select control signal for selecting a bitstream corresponding to one of the media digital broadcasts according to a user request among the searched digital broadcasts; and a demultiplexing and decoding unit for
- 25 demultiplexing the bitstream supplied from the interfacer, restoring the demultiplexed signal into prior-to-being-encoded broadcast signal of a programme.

Here, it is preferable that the tuning and channel

30 demodulation unit comprises a first tuning and channel demodulation unit for receiving and channel-demodulating a broadcast signal transmitted via a first medium, among the transmitted media, and a PCMCIA card including a second

tuning and channel demodulation unit for receiving and channel-demodulating at least a broadcast signal transmitted via at least one medium differing from the first medium.

5

It is preferable that the interfacer enables the PCMCIA card including a second tuning and channel demodulation unit to be attached thereto and detached therefrom, and supplies one of the bitstreams output from the first and
10 second tuning and channel demodulation units to a demultiplexing and decoding unit.

Also, the interfacer and the PCMCIA card including the second tuning and channel demodulation unit are non-
15 obviously modified from a common interface (CI) standard to descramble various scrambling signals corresponding to various scramble types according to the DVB system, and are utilized in a preferred embodiment in order to accomplish the objects of the present invention. The
20 interfacer and the PCMCIA card are efficiently controlled by a controller according to a user interface menu, to thereby selectively enable the watching of one of at least two media digital broadcast signals, conveniently and economically, in a single digital broadcast receiver.
25

For a better understanding of the invention, and to show how embodiments of the same may be carried into effect, reference will now be made, by way of example, to the accompanying diagrammatic drawings in which:

30

Figure 1 is a block diagram schematically showing a general digital broadcast receiver;

Figure 2 is a block diagram showing a digital broadcast receiver for selectively enabling the display of digital broadcasts of respectively different media according to a preferred embodiment of the present invention;

5

Figure 3 is a flow-chart view for explaining a method for selectively enabling the display of digital broadcasts of a respectively different medium according to a preferred embodiment of the present invention; and

10

Figure 4 shows a preferred embodiment of a user interface menu shown in Figure 3.

Preferred embodiments of the present invention will be described with reference to the accompanying drawings.

Referring to Figure 2, a first tuning and channel demodulation unit 20 receives and channel-demodulates a broadcast signal transmitted via a first medium among various media such as a terrestrial wave, a satellite wave, a cable and so on, and restores the received signal into a prior-to-being-channel-modulated bitstream. The tuning and channel demodulation unit 20 error-correction-decodes the restored bitstream in the case that the received signal has been error-correction-encoded.

A second tuning and channel demodulation unit 21 receives and channel-demodulates at least a broadcast signal transmitted via at least one medium differing from the first medium and restores the received signal into a prior-to-being-channel-modulated bitstream. For example, when the first tuning and channel demodulation unit 20 receives and channel-demodulates a digital terrestrial

broadcast signal, the second tuning and channel demodulation unit 21 receives and channel-demodulates a digital satellite broadcast signal and/or a digital cable broadcast signal. Also, the second tuning and channel demodulation unit 21 error-correction-decodes an error-correction-encoded signal as in the first tuning and channel demodulation unit 20. Here, the second tuning and channel demodulation unit 21 is preferably built in a PCMCIA card (a PC card according to a standardized specification of the Personal Computer Card International Association). The PCMCIA card further includes a unit for descrambling a scrambled signal in addition to the second tuning and channel demodulation unit 21.

15 An interfacier 22 is configured such that the PCMCIA card including the second tuning and channel demodulation unit 21 may be attached thereto or detached therefrom. Also, the interfacier 22 selects one of the bitstreams output from the first tuning and channel demodulation unit 20 and the second tuning and channel demodulation unit 21 according to a select control signal applied from a controller 24 and supplies the selected result to a demultiplexer 16 and/or the controller 24. Here, the interfacier 22 is configured such that at least one PCMCIA card for digital broadcasts of a respectively different medium can be mounted, and switches an input end switch according to a control signal output from the controller 24 to thereby selectively output one of the bitstreams corresponding to a respectively different medium broadcast signal.

The controller 24 searches the kinds of the medium digital broadcasts which can be received in the first and second

tuning and channel demodulation units 20 and 21 according to a user menu manipulation and/or setting using a user interface 25 and displays the searched result on a display screen. Here, the controller 24 can switch the input end
5 of the interfacier 22 to one of the output ends of the tuning and channel demodulation units 20 and 21 sequentially or respectively, and checks a signal output from the respective tuning and channel demodulation units 20 and 21. Accordingly, the kinds of all medium digital
10 broadcasts which can be received in the digital broadcast receiver are discriminated. A user selects a digital broadcast of a medium to be viewed among the medium digital broadcasts which have been displayed on a screen, using a user interface menu. Here, it is obvious that the
15 digital broadcast of medium to be viewed can be preset by a user or a programme. Accordingly, the controller 24 applies a select control signal for supplying a demultiplexer 16 with a bitstream of the digital broadcast of the medium corresponding to a user request, to the
20 interfacier 22.

Since the demultiplexer 16, an audio decoder 17, a video decoder 18 and an NTSC/PAL encoder 19 shown in Figure 2 perform the same functions as those denoted as the same
25 reference numerals in Figure 1, the detailed description thereof will be omitted.

In the digital broadcast receiver according to the preferred embodiment of the present invention, the
30 controller 24 controls the interfacier 22 for interfacing the units 20 and 21 for receiving and channel-demodulating at least two medium digital broadcasts, to thereby selectively watch one of the at least two medium digital

broadcasts conveniently and efficiently. Further, in the digital broadcast receiver according to the preferred embodiment of the present invention, at least one PCMCIA card containing at least one channel demodulator is
5 attached to or detached from the interfacier, to thereby further provide an effect of enabling users to watch a plurality of medium digital broadcasts at low cost and efficiently.

10 The operation of the digital broadcast receiver shown in Figure 2 will be described with reference to Figures 3 and 4.

Referring to Figure 3, a system designer firstly
15 establishes a user interface menu which is used for selectively watching at least two medium digital broadcasts in the digital broadcast receiver shown in Figure 2 (step 300). Referring to Figure 4, a preferred embodiment of the user interface menu established in step
20 300 includes a find menu and a select menu. In more detail, the user interface menu includes an interface menu as a lower menu of a set-up menu for establishing a general system, and the find menu and the select menu as the lower menus of the interface menu. Here, the find
25 menu is a menu for discriminating or searching the kinds of all medium digital broadcasts which can be received in the present digital broadcast receiver, and the select menu is a menu for selecting one of the discriminated medium digital broadcasts.

30

In the case that the digital broadcasts of a respectively different medium are selectively watched, a user selects a find menu which has been established and displayed on a

screen in step 300, by use of the user interface 25 such as a cursor of mouse, remote controller or keyboard. Accordingly, the controller 24 controls the interfacers 22 to sequentially or respectively switch the input end of the interfacers 22 to the output end of the first tuning and channel demodulation unit 20 or the output end of the second tuning and channel demodulation unit 21 contained in the PCMCIA card. Thus, the controller 22 checks an input signal supplied from each of the tuning and channel demodulation units 20 and 21 in response to the interfacers 22 and discriminates the kinds of all the medium digital broadcasts which can be received in the digital broadcast receiver (step 310), to thereby display the discriminated result on the screen.

Meanwhile, in the case that the user watches a particular medium digital broadcast, e.g. a digital terrestrial broadcast chiefly, and watches the digital broadcasts of the different media, e.g., a digital satellite broadcast or a digital cable broadcast occasionally, it is more preferable that an establishment value of the digital broadcast receiver is fixed so that only a particular medium digital broadcast can be viewed before modifying the fixed value and the digital broadcasts of the different media can be selected and viewed according to a user request. In this case, it is established in advance so that the input end of the interfacers 22 is connected to the output end of the first tuning and channel demodulation unit 20 at the time of a system initialization when power is applied to the digital broadcast receiver. In the case that the user wishes to watch the different medium digital broadcast other than a predetermined medium digital broadcast, the user selects

the find menu by use of the user interface 25 in step 310. Accordingly, the at least one medium digital broadcast which can be received and channel-demodulated is found in the PCMCIA card capable of receiving and channel-demodulating at least one media digital broadcast signal. In the case that the number of the PCMCIA card for the one medium digital broadcast different from the first medium inserted in the interfacer 22 is one, that is, the digital broadcast receiver can receive and channel-demodulate only a digital broadcast signal of a medium different from the first medium, by use of the PCMCIA card, the input of the interfacer 22 using an input switching button provided in a remote controller. Then, it is checked and discriminated whether the input signal from the PCMCIA card is a digital terrestrial broadcast, a digital satellite broadcast, or a digital cable broadcast, in step 310.

When the kinds of the digital broadcasts discriminated in step 310 is displayed on the screen, the user manipulates a select menu established in step 300 by use of the user interface 25, to select a digital broadcast of a medium to be viewed (step 320). In particular, in the case that a particular medium digital broadcast is fixedly viewed and the different one medium digital broadcast is received and channel-demodulated using the PCMCIA card as in the above-described embodiment, it may be only determined in the select menu whether or not a user will watch the digital broadcast.

30

In step 320, if a digital broadcast of a medium to be viewed is selected by a user, the controller 24 applies a select control signal for selecting a digital broadcast of

a corresponding medium to the interfacer 22. The interfacer 22 selects a bitstream supplied from a corresponding tuning and channel demodulation unit according to the control signal applied from the controller 24 and supplies the selected bitstream to the demultiplexer 16. As a result, the demultiplexing and decoding unit comprised of the demultiplexer 16, the audio decoder 17 and the video decoder 18 demultiplexes and restores the bitstream input from the interfacer 22 as described with reference to Figure 1, in such a manner that a particular programme among the programmes multiplexed in the digital broadcast signal of the medium to be viewed can be watched.

Thus, the present invention selects and watches one of the at least two medium digital broadcasts in a single digital broadcast receiver more conveniently, efficiently and economically.

Meanwhile, a plurality of modifications which have not been described can be accomplished within the technological scope of the present invention, which is apparent to a person who has an ordinary skill in the art who understands well the technological concept and the above-described embodiment of the present invention.

The reader's attention is directed to all papers and documents which are filed concurrently with or previous to this specification in connection with this application and which are open to public inspection with this specification, and the contents of all such papers and documents are incorporated herein by reference.

All of the features disclosed in this specification (including any accompanying claims, abstract and drawings), and/or all of the steps of any method or process so disclosed, may be combined in any combination, except combinations where at least some of such features and/or steps are mutually exclusive.

Each feature disclosed in this specification (including any accompanying claims, abstract and drawings), may be replaced by alternative features serving the same, equivalent or similar purpose, unless expressly stated otherwise. Thus, unless expressly stated otherwise, each feature disclosed is one example only of a generic series of equivalent or similar features.

The invention is not restricted to the details of the foregoing embodiment(s). The invention extend to any novel one, or any novel combination, of the features disclosed in this specification (including any accompanying claims, abstract and drawings), or to any novel one, or any novel combination, of the steps of any method or process so disclosed.

CLAIMS

1. A method for enabling the display of one of at least two digital broadcasts transmitted via a respectively
5 different medium in a digital broadcast receiver, the method comprising the steps of:

(a) establishing a user interface menu for selecting for display one of the digital broadcasts;

10

(b) discriminating amongst the at least two digital broadcasts transmitted via at least two media which can be received in the digital broadcast receiver using the established user interface menu;

15

(c) selecting a digital broadcast of a medium to be viewed among the discriminated medium digital broadcasts; and

(d) restoring the selected digital broadcast signal into a
20 prior-to-being-encoded broadcast signal.

2. The method of claim 1, wherein said user interface menu used in step (a) comprises a first menu for discriminating the digital broadcasts of the media which
25 can be received in the digital broadcast receiver, and a second menu for selecting a particular medium digital broadcast among the discriminated digital broadcasts.

3. The method of claim 1 or 2, wherein said digital
30 broadcast receiver is established in advance to select a digital broadcast transmitted via the first medium among the media, and said step (b) comprises the step of discriminating the kinds of at least a digital broadcast

transmitted via at least one medium differing from the first medium among the media.

4. A digital broadcast receiver for selectively enabling
5 the display one of at least two digital broadcasts transmitted via a respectively different medium, the digital broadcast receiver comprising:

10 a tuning and channel demodulation unit for receiving and channel-demodulating the at least two digital broadcast signals individually and restoring the received signals into a prior-to-being-channel-modulated bitstream;

15 an interfacer for selectively supplying one of the medium bitstreams output from the tuning and channel demodulation unit according to an input select control signal;

20 a controller for searching amongst the digital broadcasts of the various media which can be received in the tuning and channel demodulation unit by controlling the interfacer, and supplying to the interfacer the select control signal for selecting a bitstream corresponding to one of the digital broadcasts according to a user request among the searched digital broadcasts; and

25 a demultiplexing and decoding unit for demultiplexing the bitstream supplied from the interfacer, and restoring the demultiplexed signal into prior-to-being-encoded broadcast signal of a programme.

30

5. The digital broadcast receiver of claim 4, wherein said tuning and channel demodulation unit comprises a first tuning and channel demodulation unit for receiving

- and channel-demodulating a broadcast signal transmitted via a first medium, among the transmitted media, and at least one PCMCIA card including a second tuning and channel demodulation unit for receiving and channel-
- 5 demodulating at least a broadcast signal transmitted via at least one medium differing from the first medium among the media, and wherein said at least one PCMCIA card is detached from and attached to said interfacer.
- 10 6. A method for watching one of at least two digital broadcasts substantially as herein described with reference to Figures 2 to 4.
- 15 7. A digital broadcast receiver substantially as herein described with reference to Figures 2 to 4.



INVESTOR IN PEOPLE

Application No: GB 0001655.0
Claims searched: 1-7

18.

Examiner: Frank D. Moeschler
Date of search: 7 August 2000

Patents Act 1977 Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:
UK Cl (Ed.R): H4F (FAAN, FBA, FBB, FGG, FKE, FKX)
Int Cl (Ed.7): H04N - 5/00, 5/44, 7/167
Other: ONLINE: WPI; JAPIO; EPODOC

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X,P	GB 2339104 A (SANYO) See Figs 2 and 3	1,4
X,P	GB 2330722 A (GENERAL INSTRUMENT CO.) See whole document	1,4
X	EP 0849943 A1 (SIEMENS) See Column 2	1,4
X	WO 98/56188 A2 (SONY) See Pages 8, 16, 25-27 especially	1-5
X	WO 97/28499 A1 (AWARD SOFTWARE) See Pages 6-13	1-5
X	US 5838384 (SCHINDLER et al) See Fig 1A	1,4
X,P	JP 110150688 A (SHARP) See Abstract	1,4

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.